Second Session—Twenty-second Parliament

1955

Joint Committee of the Senate and the House of Commons

ON

CAPITAL AND CORPORAL PUNISHMENT AND LOTTERIES

Joint Chairmen:—The Honourable Senator Salter A. Hayden

and

Mr. Don F. Brown, M.P.

MINUTES OF PROCEEDINGS AND EVIDENCE

No. 17

TUESDAY, MAY 10, 1955

WITNESSES:

Professor J. K. W. Ferguson, Head of the Department of Pharmacology, University of Toronto, and an anonymous medical expert.

Appendix A: Prepared Summary of Medical Evidence.

Appendix B: Extract from the Minutes of Evidence No. 28 taken by the U.K. Royal Commission on Capital Punishment on November 3, 1950 (*Purchase Memorandum*).

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A. Small,
Clerk of the Committee.

MINUTES OF PROCEEDINGS

TUESDAY, May 10, 1955.

The Joint Committee of the Senate and the House of Commons on Capital and Corporal Punishment and Lotteries met *in camera* at 10.00 a.m. The Joint Chairman, Mr. Don. F. Brown, presided.

Present:

The Senate: The Honourable Senators Aseltine, Fergusson, Hodges, McDonald, Tremblay, and Veniot—(6).

The House of Commons: Miss Bennett, Messrs. Boisvert, Brown (*Essex West*), Cameron (*High Park*), Fairey, Garson, Leduc (*Verdun*), Mitchell (*London*), Montgomery, Shipley (Mrs.), Thatcher, Thomas, and Winch—(13).

In Attendance: Professor J. K. W. Ferguson, Head of the Department of Pharmacology, University of Toronto, and an anonymous witness; Mr. D. G. Blair, Counsel to the Committee.

On motion of the Honourable Senator McDonald, seconded by the Honourable Senator Veniot, the Honourable Senator Tremblay was elected to act for the day of behalf of the Joint Chairman representing the Senate due to his unavoidable absence.

On request of the presiding Chairman, Counsel introduced the witnesses to the Committee.

Dr. Ferguson presented a prepared summary of his testimony (*see Appendix A*) dealing with medical evidence on alternative methods of execution. The witnesses elaborated on the summary and were questioned thereon.

During the course of the questioning period, references having been made to the Memorandum of Mr. W. B. Purchase appearing in No. 28 of the Minutes of Evidence taken by the U. K. Royal Commission on Capital Punishment on November 3, 1950, it was agreed that the said Memorandum be printed as Appendix B to this day's proceedings.

The presiding Chairman expressed the Committee's appreciation to the witnesses for their presentations.

The witnesses retired.

During the course of the proceedings, the Committee agreed, *inter alia*, that the evidence taken this day *in camera* be printed *in extenso* subject to prior editing by the witnesses.

At 12.45 p.m., the Committee adjourned to meet again as scheduled.

A. Small,
Clerk of the Committee.

58054—1½

EVIDENCE

MAY 10, 1955,
10.10 A.M.

The PRESIDING CHAIRMAN MR. BROWN (*Essex West*): Would you come to order, ladies and gentlemen. I have a motion that Senator Tremblay should be co-chairman. All in favour?

Carried.

The PRESIDING CHAIRMAN: Will you come forward please, Senator Tremblay?

The sub-committee met in conformity with your wishes and we have arranged to hear the hangman tomorrow. In order to conform with the rules of the house an authorization was made for a report to both Houses which would give authority to this committee to meet beyond the premises of the parliament buildings. Tomorrow, therefore, we will hear a hangman.

Hon. Mrs. FERGUSSON: Providing the Senate agrees when it comes up before them.

The PRESIDING CHAIRMAN: Tomorrow we are going to hear a hangman.

Hon. Mrs. HODGES: Does that report not go before the Senate also?

The PRESIDING CHAIRMAN: Yes. I suppose it could be made retroactive if the Senate is not in session.

Hon. Mrs. HODGES: The Senate will meet tonight.

Hon. Mrs. FERGUSSON: It is, providing they give their agreement, but I suppose they will.

The PRESIDING CHAIRMAN: Provided the Senate agrees we will all meet and if the Senate does not agree I do not know what will be done. In any event we will meet tomorrow morning at 10.15 o'clock in room 277 and we will all have to be there punctually at 10.15. Transportation will leave here at 10.30 and we will be taken to an undesignated place where we will have the opportunity of interviewing a hangman.

Hon. Mr. MCDONALD: I was not present when this arrangement was made but I understand this was voted on and if I am not incorrect I thought we had decided not to hear a hangman previously.

The PRESIDING CHAIRMAN: We did, Senator McDonald. We voted on the question of whether we would hear a hangman sometime ago. It was voted down. We opposed it. Then the question was reconsidered very deeply by members of the committee in view of the fact that we are hearing evidence and have heard evidence on the question of electrocution; we are today going to hear something about injections, and on Thursday we are going to hear about gas chambers; we have heard also of the other methods of execution, but we have not heard, except by indirect evidence, of the method which is employed in our own country which is hanging. Therefore, the members of the committee were quite concerned about it and Mr. Cameron, a member of the committee, consulted me and I suggested if he felt that way he should write me a letter, which he did. I submitted the letter to the committee and the matter was reconsidered and I think we voted unanimously.

Hon. Mrs. HODGES: Not unanimously; by a majority.

The PRESIDING CHAIRMAN: I am sorry. It was 10 to 2 that we decided to hear a hangman.

Hon. Mr. MCDONALD: Of course, we have heard quite a lot about our method of capital punishment through several witnesses.

The PRESIDING CHAIRMAN: Yes, we have heard indirectly. We have never heard any direct evidence as to the method or practice of hanging and so your subcommittee has considered the matter and as a matter of fact the subcommittee are meeting immediately after this meeting today to consider a form of questionnaire which will be used by our counsel in interrogating the witness tomorrow.

Mrs. SHIPLEY: We have heard evidence just as direct on hanging as we have and will be hearing on electrocution and gassing. I think that is a statement of fact.

The PRESIDING CHAIRMAN: I think it is probably more a statement of opinion.

Mr. THATCHER: On a point of order, have we not decided the question?

Hon. Mr. GARSON: We had decided it once before, as a matter of fact.

The PRESIDING CHAIRMAN: We decided it. Apparently that is what keeps our minds so clean; we change them so often.

Mr. WINCH: Let us proceed with the evidence.

The PRESIDING CHAIRMAN: If there is nothing else, the subcommittee will meet at the conclusion of this meeting. You should make a note that on Thursday of this week we will hear Clinton T. Duffy of California, who is the past warden of San Quentin Penitentiary in California. Mr. Duffy is going to speak to us on the gas-chamber method of execution and will also speak on the subject of corporal punishment. Mr. Duffy is at the present time a member of the Adult Authority of California. We will be meeting in this room at 10.00 a.m. Mr. Duffy is rather an important witness and will, I believe be the last witness before this committee.

Now, if there are no questions, we will proceed with today's hearing and I would ask Mr. Blair to introduce the witnesses.

Mr. BLAIR: Mr. Chairman, we are privileged to have with us today two witnesses from the city of Toronto, Professor Ferguson, who is the head of the department of pharmacology in the college of medicine at the University of Toronto. We are under a considerable obligation to Dr. Ferguson because he has consulted with me on several occasions during the winter and spring in connection with the work of the committee and several weeks ago he undertook to organize a presentation of some of the medical aspects of alternative methods of carrying out the death sentence.

In addition to Dr. Ferguson we have with us Dr. "X" who is a neuro-surgeon in private practice.

I believe Professor Ferguson will speak first. We have already distributed a summary of his remarks. Professor Ferguson.

Dr. J. K. W. FERGUSON (*Faculty of Medicine, University of Toronto*): Mr. Chairman and members of the committee. You have before you a summary of what I propose to say, in the form of short dogmatic statements which I have made in this form so that my opinion could be clearly recorded and understood and also to give you some points on which to focus in order that you might ask questions about the statements.

First of all, you will note that I am not in favour of execution by hanging. I feel it should be replaced by a method which is known to be painless. You may well ask how can we know that any such process is painless. There are many portals to death and through many of these many thousands of people have passed a litle way and have come back and under those conditions we

have the very best possible evidence on which to base a conclusion that this process is or is not painless or is or is not uncomfortable. That is the kind of evidence which I find convincing and I am sure it would be most convincing to you. Any other kind is a matter of inference.

The second point is that I feel that no assurance can be given that judicial hanging by breaking the neck causes instantaneous loss of consciousness. It probably does in many cases, but it is one experience from which people cannot return to tell us what it feels like. I think we have good reason to believe that in many cases loss of consciousness has not been immediate. I understand that the introduction of breaking the neck was a relatively modern refinement to hanging and was intended to be humanitarian. I think there are reasons, however, for thinking that this was not accomplished. In the first place, I think that in many cases of hanging loss of consciousness has been due to strangulation and not due to damage of the brain or spinal cord.

However, to quiet our conscience a little bit, I think it is important to note that slow hanging or strangulation is not as uncomfortable as most people think. We do not know, for sure, how quickly consciousness is lost, but we have good reason to think that it goes in ten or twenty seconds. What happens after that is immaterial to the subject.

Witnesses may be deeply shocked by muscular convulsions which occur, but they mean nothing to the victim. We can say that with great assurance, because, during the last few years at any rate, convulsions have been produced in many ways in people who have survived to describe their sensations. For example, during the war, convulsions were introduced from the lack of oxygen in the brain, in the course of training, to show airmen what it was like to experience lack of oxygen at high altitudes. We know from thousands of these cases that they lost consciousness painlessly and it was some seconds after, that they began to twitch and convulse.

Whether the loss of consciousness is due to lack of oxygen in the air which they breathe, or whether it is produced by the phenomenon known as blackout or "G", the convulsions which have occurred follow the loss of consciousness and they mean nothing at all to the victim. He does not remember a thing about it, not a thing. He has no uncomfortable memories at all. Therefore I believe that the introduction of the fall with the possibility of painful shock at the end of the rope has really not accomplished what it was supposed to do. It has not added anything to the "humanizing" of the execution, because from earliest infancy we are afraid of falling, and we are afraid of sudden pain. The drop only adds terror to the process of hanging and possibilities for mistakes. I do not think that it adds any "humanity" to it.

You have heard evidence that the process of judicial hanging is very shocking to the witnesses, and I think with good reason. Now, turning to an alternative method, we know that electrocution causes instantaneous loss of consciousness. Again muscular convulsions may follow and time is required to produce final and irreversible death, but these considerations are really irrelevant. We know that at the first instant of shock, consciousness is lost. How do we know that? Because in recent years literally hundreds of thousands of people have been electrocuted deliberately in a therapeutic process known as electro-shock therapy, in which electrodes are applied to the head, and currents of known magnitude are applied. These people do not remember a thing about it. We know what currents are applied, and what voltages are applied. All those things are now well known.

You have heard some rumours about burning from electrocution. That means an enormous amount of current was used for far too long a time. There is no necessity for this, from what we know now. And you have heard that many shocks have been given to stop the heart. Stopping the heart by an

electric current is a tricky matter. The heart is more easily stopped by relatively small currents than by relatively large currents. That is something again that has only become well known in recent years. The point I am making is that modern electrocution can produce instantaneous unconsciousness and it could be done without burning, and with skilful design it could be made to stop the heart instantaneously, something which has had to be done hitherto by trial and error, by varying voltages.

You have also heard of the use of lethal gases and I understand that cyanide gas is the one which has been used most frequently. I have no personal experience with executions by this method, but cyanide gas has a pungent odor and the equipment required to administer it and safeguard the people around is expensive. Loss of consciousness is not unpleasant, we are told, but again the victim has never come back, he cannot come back to tell us about it.

Finally, regarding anaesthetics, of those administered by an inhalation, nitrous oxide has been taken by thousands of people who can tell us what it feels like and most agree it can be very pleasant. It does not produce instantaneous but a pleasant loss of consciousness. It is not a very practical way because it requires cooperation or at least acquiescence. I feel if hanging is retained it would be humane to offer anaesthesia either by vein or by the inhalation of nitrous oxide which most of you know as laughing gas or dental gas. It would be humane to offer these as alternatives to hanging. I do not think they are more humane than electrocution because we do know that electrocution causes instantaneous loss of consciousness. I think that is all I can say at the moment.

The PRESIDING CHAIRMAN: Thank you very much. Dr. "X", would you like to say something on this point?

Dr. "X": At your counsel's request I have been asked to discuss the points concerned with hanging as they affect the brain and the spinal cord. Now, let me say first that I have reviewed the evidence that has been submitted to your committee and also the report of the royal commission in Great Britain having to do with execution or capital punishment and there are but twenty post-mortems recorded in the evidence—I am open to correction; but I think it was twenty—and one must consider first the injury to the spinal cord, which is conceded or has been put forward as the method of producing death and loss of consciousness. This depends on what level the spinal cord is injured or transected. There are seven cervical neck vertebrae and if the spinal cord is severed between the fifth and sixth or sixth and seventh—those are the lower cervical vertebrae—it is a known fact that consciousness is not lost.

I can quote you a case of a squadron leader who was flying an aircraft during the war and the aircraft crashed and his neck was snapped forward and he was immediately paralyzed in his arms and legs without loss of consciousness and he sat in the aircraft waiting for it to catch fire and it did not. He was then treated and he has since rehabilitated himself and, in fact, Mr. Blair tells me he was on the radio on the "Ten Years After" program on Sunday night. This patient has been known to me personally from the time he arrived in hospital in England until the present time. There are others, people who have dived into shallow water and broken their neck and severed their spinal cord without loss of consciousness and who can describe vividly their attempt to get to the surface; so it is clear that the ordinary fracture of the neck C5-6 or C6-7 need not produce unconsciousness. What it does do is produce flaccid paralysis, paralysis of the legs and most of the arms at that level and the muscles of respiration save the diaphragm; that is the big muscle between the abdomen and the chest that sucks air in and out like a pump.

If the fracture dislocation of the neck is higher, say C2-3 or C1-2 or perhaps even C3-4 and there is a traction injury as well as a dislocation, it is recorded

that the lower part of the brain stem may be pulled out of the brain; I think there would be substantial agreement amongst all people who have had acquaintance with accidents involving that part of the brain and spinal cord, that loss of consciousness would be instantaneous. The heart can go on beating but the individual cannot be revived. That is one method of producing death by hanging, as I understand hanging.

The second method is that mentioned by Professor Ferguson whereby the noose so constricts the large arteries supplying the brain that there is cerebral anemia, the brain does not get oxygen and that produces unconsciousness in a few seconds. In the course of operating on or preparing to operate on certain patients who have disturbances of the blood vessels of the brain, it may be necessary to shut off both of the great arteries to allow a period of time for operation on the blood vessels of the brain that are diseased. Loss of consciousness develops rapidly.

The third method is that of straight asphyxia, which is the shutting off of the windpipe. If it is uncomplicated asphyxia, you can all hold your breath for one minute or more; a colleague who was a champion long distance runner says he can hold his for three minutes. In Canada, from the evidence I have been shown there is no evidence as to the nature of the injuries caused by hanging. There has not been a post-mortem examination carried out since 1919 or 1920, so that with deference to any opinion or information you may receive, one can only deduce what might have happened. In reading over the available evidence, there is, I have noted, the evidence by Dr. McLean from Welland and the doctor from Montreal and Dr. Hill in Toronto and there are certain things that to me are very disturbing. The first, of course, is the episode where the hangman had to tackle the victim and drag on his legs to produce his death and that is because he was trying to pull himself up the rope; so clearly he did not have his carotid arteries shut off or his spinal cord destroyed. I must point out that humans differ from chickens who can run around after their heads have been cut off, but a human, if his spinal cord is injured is immediately paralyzed and cannot move; there are no reflexes; if you tap the knee the knee does not jerk; so in that particular instance I would say there was neither anemia of the brain nor was there a spinal cord injury.

Mr. BLAIR: Mr. Chairman, pardon me for interrupting, but so the members of the committee will know the episode to which Dr. "X" is referring, I might say it is recorded in the evidence taken by the House of Commons committee which in 1937 considered a proposal to change the method of execution and the specific evidence referred to occurred on March 4, 1937. The medical man from Montreal to whom the doctor is referring was Dr. Daniel Plouffe, then the superintendent of the asylum for the criminally insane at Bordeaux. The hanging episode to which the doctor is referring was described by Mr. Stephen Wills, then the acting deputy sheriff of Toronto.

Dr. "X": I am open to correction by Mr. Blair, who has the information at his finger-tips; but I think Dr. Hill reported that the heart continued to beat for forty-five minutes in one patient in the Toronto area. Well, clearly, that patient did not have, I should say, total asphyxia because the heart will not, as I understand it from consulting with my medical colleagues before appearing before you, the heart will not stand asphysia and continue to beat if no oxygen is reaching the lungs and circulation for forty-five minutes. In that case there was certainly not complete asphyxia. Whether the victim had his spinal cord severed or whether he was suffering from lack of arterial blood getting to his brain or not, producing anemia to make him unconscious, one does not know.

Mr. BLAIR: This is recorded on page 554 of last year's evidence.

Dr. "X": Dr. McLean in Welland reported the heart continued to beat for eighteen minutes or twenty-five minutes and I think he gave us his opinion that

at least in two of the four executions that he took a positive interest in asphyxia was the cause of death. Is that correct, Mr. Blair?

Mr. BLAIR: He offered that opinion and that is found at page 649 of last year's testimony.

Dr. "X": To me it is difficult to understand how there could be total asphyxia if the heart continued to beat for twenty-five minutes. In other words, the windpipe would not be totally occluded; that is the opinion of my most respected professorial colleagues in Toronto, that the heart will not stand total asphyxia and continue to beat for twenty-five minutes.

The PRESIDING CHAIRMAN: And when you have total asphyxia you have unconsciousness?

Dr. "X": Yes. One could have unconsciousness if the arterial blood to the brain was shut off and I cannot say if every time the arterial blood to the brain is shut off the windpipe is shut off. The fact of the matter is there is not sufficient evidence to know how people are dying following the execution in Canada.

By contrast the evidence in the royal commission report in England indicates that of recent years Mr. Pierrepoint, the executioner in Great Britain whose uncle and grand father were executioners also, has become so skilful he has been invited to go around Europe executing war criminals and the like, and in the last series of autopsies which have been reported there has been almost universal fracture or dislocation of the neck at C 2-3 or C 3-4 and with several of the patients, actual pulling apart of the brain. That would in my opinion be an instantaneous death. I know of one patient in whom an injury was produced to the medulla, that is the first part of the brain where the vital centres are, with instantaneous death. It would appear that by the constriction of the carotid arteries producing anemia, and due to dislocation of the neck of the type produced in England in recent years that loss of consciousness was almost instantaneous. I cannot speak about what is happening in Canada today save by inference, and my plea to this committee is that if hanging is to remain the method of execution that there should be instituted at the earliest possible opportunity a post-mortem examination following execution carried out by a skilled pathologist. You all know of Dr. Klotz in this city, the pathologist, who is an outstanding man. There are other pathologists in the University of Montreal, Queen's, Toronto, McGill and Saskatchewan.

The PRESIDING CHAIRMAN: And Western.

Dr. "X": Manitoba and Western etc. Autopsies should be carried out on these people regularly and uniformly, and very quickly, I think, information will accumulate as to what actually happens in Canada when an execution by hanging is carried out if it is to be continued. That, of course, is beyond my province.

The PRESIDING CHAIRMAN: That is your presentation, Doctor?

Dr. "X": Yes.

The PRESIDING CHAIRMAN: Mr. Blair, have you any questions you would like to submit first to the witnesses?

Mr. BLAIR: Perhaps first of all it might help if the doctors explained to us the medical reason why a heart will continue to beat after death is a virtual certainty?

Dr. FERGUSON: Mr. Chairman, the heartbeat, or the action of the heart, is independent of the brain. The heart-rate may be modified by the brain but for the most part its action is independent. Until it uses up the available oxygen and sources of energy within itself it continues beating and may do so even when it is removed from the body.

Mr. BLAIR: So that the heart is apt to continue to beat and will be heard through a stethoscope unless some direct injury has been done to the heart.

Dr. FERGUSON: Yes. That is so. To pronounce a man irreversibly dead we would insist that the heart be stopped. As long as the heart beats there is possibility that the person may revive depending on what the other injuries were.

Mr. BLAIR: I wonder if, referring to the evidence we heard last year of occasional hangings where people were observed to twitch and convulse, whether Dr. "X" would care to say if their spinal cord might have been severed.

Dr. "X": I should say that in a case described where the hangman had to drag on the victim's legs because he was making an involuntary movement that the cord certainly had not been damaged or divided at a high level. It is a very difficult question because it depends on what stage you are talking about. If he twitched before he had a convulsion because of lack of oxygen from his brain I would say his cord had not been divided. I would think he would not have convulsive movements in his legs if his cord had been divided. It depends on what level the spinal cord was damaged, whether his arms would twitch with the convulsion due to lack of oxygen. If it was a lower level in the spinal cord then he might well twitch in his arms with the convulsion due to lack of oxygen to his brain when he was unconscious.

Mr. BLAIR: The fact that the subject would twitch in a convulsion would be no indication that he would be conscious?

Dr. "X": That is correct.

Mr. BLAIR: The fact that he might be observed to make movements with his arms and legs would not be in itself an indication. that he was conscious?

Dr. "X": If he was making purposeful movements then one would conclude he was not unconscious and that his cord had not been divided or seriously damaged.

Mr. BLAIR: Then, to put the question the other way, if you saw a person twitching while hanging, would there be reason to suppose he might still be conscious?

Dr. "X": If there were convulsive movements, one would assume he had anemia of his brain, and having a convulsion that his cord had not be divided. There is a difference between a purposeful movement and the movements associated with a fit or convulsion.

Hon. Mr. GARSON: How can that be diagnosed? How do you distinguish between purposeful movements and movements which are convulsive?

Dr. "X": The description of the man who tried to pull himself up a rope would be purposeful. You have all seen an epileptic seizure or fit with convulsive movements. If the cord was divided one would not expect his legs or his arms to convulse if there was a high enough division of the cord, C 2-3 or C 3-4.

Mr. BLAIR: Even if the cord is divided and there is no visible movement of the limbs, as I understand it you gentlemen say it is still possible that the subject may be conscious for the length of time it takes for asphyxia to lodge in the brain or whatever the medical process is?

Dr. "X": Will you repeat your question?

Hon. Mrs. HODGES: Would you speak louder, please?

Mr. BLAIR: Even if the cord is divided and the subject no longer twitches or moves, as I understand it, you gentlemen say it is still possible that the subject may be conscious until oxygen is cut off in the brain?

Dr. "X": That is correct, if the spinal cord injury is at a low level in the neck, C 5-6 or C 6-7 without injury to brain stem. There are 7 cervical vertabrae. If it is high up, C 2-3, one would anticipate there would be sufficient injury above and below the actual point of dislocation and injury to the brain and that he would be instantly unconscious. You used the word asphyxia. If there is sufficient constriction of the neck to shut off the carotid arteries he would be unconscious in a few seconds; if just shutting off of his windpipe alone he would be conscious however long he can hold his breath.

Mr. BLAIR: If the execution is such that the break occurs where it will destroy the nerves controlling the brain then would you think that unconsciousness is apt to be produced by the shock of the fall?

Dr. "X": Well, that requires further qualification, Mr. Chairman. An injury to the spinal cord between the fifth cervical and sixth or seventh cervical vertebrae will paralyze all the muscles of the chest which are muscles of breathing but will not paralyze the diaphram which is a very important muscle of breathing in which you can get enough oxygen in and out by its power alone. Paralysis of the muscles of breathing would not be sufficiently complete to produce asphyxiation unless it was at a higher level, about C 3-4 or C 4-5, and then the diaphram would be paralyzed and breathing impossible.

Mr. BLAIR: If he is injured high enough to destroy nerves in the diaphram will the effect of that injury produce immediate unconsciousness?

Dr. "X": I would think it would be likely it would cause or transmit damage to the brain stem.

Mr. BLAIR: We had evidence from the warden of the Illinois State Penitentiary to the effect that at the present time a voltage of 2300 is used as the chief voltage in an electrocution. Have you gentlemen any comment to make on the strength of that electric current for the purpose?

Dr. FERGUSON: Mr. Chairman, I have no first hand acquaintance with that. My experience is with the use of electro-shock to revive the heart. Let me explain that it takes more electricity to revive the heart than it does to stop it. That is something not very well known but it is an imporant point. Judging from the experience in my laboratory I would say those are unecessarily large voltages. I think they could be reduced.

Hon. Mr. GARSON: To what?

Dr. FERGUSON: I would not like to commit myself now. I am not an expert on that point.

Mr. BLAIR: But the effect of an electric shock is to stop the heart completely if properly administered?

Dr. FERGUSON: The effects of an electric shock on the heart are two; the first effect is produced by rather low voltages, eg., 110 volts, such as from an electric light if a person's hands and feet are wet. The heart is thrown into uncoordinated activity called "fibrillation". It pumps no blood. No pulse can be felt, no heart-beat is heard. The tremulous action of the heart muscle ceases entirely a few minutes later. Spontaneous return to normal action seldom occurs from this state of fibrillation. If the same strength of current passes through the brain as well as through the heart, consciousness is lost instantaneously. Now, a higher current than that will stop the heart but it will start again as soon as you turn off the current and that is why I gather it is necessary to use a variety of voltages in an electrocution and it is the low one that stops the heart for all practical purposes by inducing fibrillation.

Mr. FAIREY: Did not the witness say he used 2,300 and then 500?

Mr. BLAIR: Yes. I should say for the record that I explained his evidence on that score to the doctors before we came in here this morning, and I should say the warden of the Illinois penitentiary stated that the short shock of 2,300 volts was followed by a much longer shock of approximately 550 volts and then the process was repeated before death was pronounced.

Does the first one produce unconsciousness and the second one kill?

Dr. FERGUSON: Yes, there is no doubt about it, a current of very much less than that will instantaneously destroy consciousness, if it is passed through the brain.

The PRESIDING CHAIRMAN: Shall we go around the table, starting with Miss Bennett?

Miss BENNETT: At this stage I have no questions.

The PRESIDING CHAIRMAN: Senator McDonald?

Hon. Mr. McDONALD: I was just wondering, I think he said there had been no post-mortem examinations since 1920 on people who died from hanging; is there any information on the points we are discussing this morning on the evidence before of examinations, before 1920?

Dr. "X": It has not been submitted to me.

Mr. BLAIR: I think, Mr. Chairman, there are no records before that time; none that we have been able to discover.

Hon. Mr. McDONALD: There never were examinations carried out?

Mr. BLAIR: I suppose one cannot say they never were carried out.

The PRESIDING CHAIRMAN: But we have no record of them.

Hon. Mr. McDONALD: Has either one of the doctors present ever been present at a hanging? . . .

Dr. FERGUSON: No.

Dr. "X": No.

Hon. Mr. McDONALD: . . . to know to what degree strangulation takes place?

Mr. BLAIR: I wonder, in that connection, Dr. "X", if you would care to refer to the table of the post-mortem reports in Great Britain (*See Appendix B*) and perhaps indicate in a general way what these generally said was the cause of death?

Dr. "X": This is a very brief summary of the findings, it is on page 626 of the report of the Royal Commission on Capital Punishment, 1950, in Great Britain, and as one goes down the summary of the autopsy reports one finds that from about 1940 on there is a very high incidence of dislocation between the second and third cervical vertebrae, sometimes the third and fourth, and prior to that time there was a much higher incidence of C6 injuries going up to C1-2 sometimes. Then there are one or two cases in 1928 at C6-7; occasionally the cord was undamaged and sometimes there was wide separation of the vertebrae from traction. In more recent years you will see that the cord was torn from the medulla, that is the cord torn right out of the brain stem, which I believe would cause instantaneous death and loss of consciousness, in the last five cases. In 1943 that had occurred in three instances in Pentonville Prison as reported by Sir Bernard Spilsbury. However, in 1942 there was a C6-7 dislocation.

Hon. Mr. McDONALD: Can there be a separation of the vertebrae without damage to the spinal cord?

Dr. "X": In surgical practice it is not uncommon to have a broken neck without spinal cord injury at all levels from the first cervical vertebrae down.

The PRESIDING CHAIRMAN: Is that all on that, Dr. "X"?

Dr. "X": Yes.

The PRESIDING CHAIRMAN: Senator McDonald?

Hon. Mr. MCDONALD: No further questions.

Mr. LEDUC (*Verdun*): No questions.

Mr. THOMAS: I was wondering if it was mentioned about the length of time the heart was beating in some of these cases; how long would the heart beat providing there was a definite break in the neck high up and there was what you might call instantaneous death; how long would the heart continue to beat? Can you say?

Dr. "X": It depends on how long oxygen gets into the circulation through the lungs. I can answer your question a little differently. We had one patient who had his neck broken at a low level, C6-7, and then got a paralysis because of swelling and disturbance of function of his cord and for three or four days he had no capacity to breathe and he was put in a Drinker respirator, like a polio iron lung, and although his muscles of respiration were not working he had a clear air-way and he lived for several months. This was before antibiotics and sulfa drugs and he eventually succumbed from pneumonia, but assuming that the air-way is clear a patient can be kept alive and his heart beating.

Mr. THOMAS: Perhaps I did not make myself clear, I was presuming that there was absolute strangulation at the same time.

Dr. "X": Well, I would think only a matter of a few minutes. I consulted, as I mentioned earlier, on that point with two senior physicians from the University of Toronto and they felt if there was absolute, complete strangulation, it would be still a matter of two or three minutes or perhaps a minute or two longer than that.

Dr. FERGUSON: May I offer my opinion on that. I have never seen a person subjected to this, but if animals under anesthesia have the windpipe blocked, their heart will go beating for five, ten, or even fifteen minutes and it is a little hard to say what is the absolute limit.

Hon. Mr. GARSON: Will the pipe continue to function if it is exposed to the air?

Dr. FERGUSON: Yes, it will, but I meant all air intake was cut off.

Hon. Mr. GARSON: I think you mean which is severed, but he still could get air down?

Dr. FERGUSON: No, I did not mean cut, but occluded.

Mr. THOMAS: The reason I was asking that was it had been mentioned that when the heart continued to beat for twenty-five minutes that there could only be a partial cut-off of the air, partial asphyxiation, and I was wondering how long it would take?

Dr. FERGUSON: That is very much a matter of opinion but I think that if the heart continued to beat for more than 20 minutes some air was getting in and out of the lungs.

Mr. THOMAS: It could continue for that time, you say it is only a matter of opinion.

Dr. FERGUSON: Yes.

Dr. "X": There is another matter that bears on this. If a man has a convulsion and uses up a large amount of oxygen, I would think his heart would stop faster than if he did not have a convulsion. Our experience with anesthesia in humans would suggest that Professor Ferguson's estimate is a generous one, 20 minutes, and is based on observations of animals.

Hon. Mr. GARSON: Well, in each case it would depend upon the total residue of oxygen and the rapidity with which that was used up by the heart and the other organs.

Dr. "X": That is right.

Mr. BLAIR: Perhaps we might help the record by indicating page 642 of last year's testimony. Dr. MacLean there gave the evidence of certain authorities on forensic medicine on the length of time it takes the heart to stop beating after hanging.

Mr. THOMAS: I have no further questions.

Mr. CAMERON (*High Park*): If the spinal column were broken above the fourth cervical, death is in your opinion instantaneous?

Dr. "X": I cannot answer that unequivocally.

Mr. CAMERON (*High Park*): Well, it would be a reasonable presumption?

Dr. "X": I would say it was a reasonable assumption C 1-2, probably at C 2-3, and at C 3-4. I cannot give a positive opinion.

Mr. CAMERON (*High Park*): Well, there are three suggested causes of death; one is the one you just mentioned now, fracture of C 1-2 or C 2-3: If that has not occurred, there could be a secondary cause which you say is anemia and death in that case would ensue in a matter of 20 to 30 seconds.

Dr. "X": Carotid arteries, that is right.

Mr. CAMERON (*High Park*): The third cause is asphyxia; some air is apparently reaching the lungs from the windpipe.

Dr. "X": Those are hypothetical.

Mr. CAMERON (*High Park*): As you say, no one has ever come back to say.

Dr. "X": If we had autopsies, a great deal of light would be thrown on this thing by skilfully performed autopsies.

Mr. CAMERON (*High Park*): Could a person not suffering the first two causes of death, who had had a fracture at the level mentioned—that is to cause instantaneous death or a pressure on the carotid artery—still die from asphyxia?

Dr. "X": Could the individual who had escaped the first two—?

Mr. CAMERON (*High Park*): Who had gone through the first?

Dr. "X": It is a question of how one defines death. If there has been cerebral anemia due to a compression or occlusion of both main carotid arteries of more than very short duration, he will never recover consciousness or survive.

Mr. CAMERON (*High Park*): The point I am trying to get is this: that a person who dies from asphyxia, then by a logical process of deduction has not suffered the fracture of the neck at a level that would cause instantaneous death or a pressure on the carotid artery—in other words, he is still alive.

Dr. "X": I am sorry, I am not quite with you.

Mr. CAMERON (*High Park*): Well, you mentioned that the heart will continue to beat using the oxygen that is in the system; you also said that the fracture occurred at the level in the neck which would cause instantaneous death, the death would be practically instantaneous and the heart would continue to use up the oxygen; but then you used a third, asphyxia. Now, what I am trying to find out is: how long, under ordinary circumstances, would the oxygen in the body keep the person's heart beating?

Dr. "X": That would be a matter of opinion. Professor Ferguson thought 20 minutes would be the outside limit based on experience with anaesthetized animals. From the point of view of physicians dealing with patients, it would be a few minutes.

Mr. CAMERON (*High Park*): Well, the illustration given by Dr. MacLean I think was 25 minutes and the illustration given by the jail surgeon at Toronto

was 45 minutes. My question is: the men who lived 45 minutes obviously could not have had the first of the two causes of death happen to him; he died from asphyxia which means that his diaphram was working and oxygen was getting into his system.

Dr. "X": That is right, sir. That is one of the most disturbing features of the evidence that I have read. The question arises as to whether there was efficient strangulation in that case.

The PRESIDING CHAIRMAN: If there was not efficient strangulation, the man was still conscious?

Dr. "X": It suggests that his respiratory muscles were working and that he was not being sufficiently strangulated in terms of his windpipe. As Mr. Cameron suggests, oxygen was getting in and out of his lungs.

The PRESIDING CHAIRMAN: Would your opinion be that he was conscious or unconscious during a part or all of that period?

Dr. "X": I cannot answer that.

Dr. FERGUSON: No, I really could not answer it. It might or it might not.

Hon. Mr. GARSON: I suppose the difficulty there would be determining the boundary and whether he had gone beyond it?

Dr. FERGUSON: Yes, the question would be how much pressure was there on his carotid arteries. Was it cutting off the blood to his brain just enough to cloud his consciousness slowly or to stop it quickly.

Hon. Mr. GARSON: If the occlusion of the carotid artery in that case, hypothetically, were sufficient, he could be unconscious and still be getting wind down his pipe for an hour and his heart would continue to beat?

Dr. FERGUSON: It is possible.

Hon. Mr. GARSON: And no person would ever know even if a skilful post-mortem took place, or would the brain show it?

Dr. FERGUSON: I cannot answer that, nobody knows really.

Mr. CAMERON (*High Park*): Dr. Ferguson said it was not proven conclusively that the fracturing of the spinal column was more humane than if a person died from strangulation, the reverse might be the case.

Dr. FERGUSON: That is certainly my feeling, if I had a choice of being dropped or strung up I would choose to be strung up.

Mr. CAMERON (*High Park*): Providing it was on your carotid arteries, not on your windpipe?

Dr. FERGUSON: No, that would be uncomfortable.

The PRESIDING CHAIRMAN: If you had a choice between being dropped or strung up?

Hon. Mrs. HODGES: Pulled up.

Dr. FERGUSON: In the old-fashioned method as was used in eastern Europe during the last war.

Hon. Mrs. HODGES: They were pulled up?

Hon. Mr. GARSON: Where a chap was lynched, they were put on the ground and "heave ho".

Dr. FERGUSON: Yes.

Mr. CAMERON (*High Park*): Well, would not your opinion be influenced by the waiting period? You may have to go there and have the terrible suspense that your neck was going to be broken.

Dr. FERGUSON: You are thinking of the drop in hanging?

Mr. CAMERON (*High Park*): Yes, and comparing the two of them the inhumanness might come in there, rather than the actual breaking of the neck, the thinking of it.

Dr. FERGUSON: Yes, I would agree with that, that is what would worry me, the thought of the fall and the thought of what it was going to be like, the thought of that would be more terrifying than the knowledge that in a matter of ten or twenty seconds I would lose consciousness due to pressure on the neck.

Mr. CAMERON (*High Park*): If the first method were adopted it would just be a blind flash and then it is all over.

Dr. FERGUSON: It may be, but who can say?

The PRESIDING CHAIRMAN: If you take your watches and just determine how long twenty seconds is, as I have been doing just now, you will find it is a long time.

Hon. Mrs. HODGES: Twenty seconds can seem very much longer under some circumstances than others.

Mr. CAMERON (*High Park*): If the spinal cord is broken in the approved position for an efficient cause of death, the death is instantaneous, almost the same as an electric current passing through your system, the consciousness is gone as soon as that vital cord is snapped?

Dr. FERGUSON: Mr. Chairman, I think perhaps there is a little disagreement between Dr. "X" and I, he has great faith in that, I do not have so much faith in that. It is an inference. Nobody has come back to tell us after snapping cervical vertebrae between the first and second, second and third, or third and fourth, just how quickly consciousness is lost. It is just an inference.

Mr. CAMERON (*High Park*): It must be a matter of seconds, no matter what the inference is, whether it is instantaneous or shortly thereafter; it is not more than a few vital seconds that unconsciousness ensues and you are dead, your heart is beating but you are dead.

Dr. FERGUSON: I hope so, Mr. Chairman, but I am not sure of it.

Mr. CAMERON (*High Park*): I do not think I have any further questions.

The PRESIDING CHAIRMAN: Mr. Boisvert?

Mr. BOISVERT: Dr. Ferguson—

The PRESIDING CHAIRMAN: Is it "doctor" or "professor"?

Dr. FERGUSON: I answer to either.

Mr. BOISVERT: From your evidence am I right in deducing that you would favour electrocution instead of hanging?

Dr. FERGUSON: Yes, sir.

Mr. BOISVERT: In the matter of execution, I think we should be concerned with the humanity of the process, the certainty of the process and also the decency of the process; would you not then think that the guillotine, which is the method used in France, is the most effective instrument as to the certainty of the execution?

Dr. FERGUSON: I think I would agree with that.

Mr. BOISVERT: That is all.

Hon. Mr. McDONALD: I wonder if we could have that question again, I did not hear it.

The PRESIDING CHAIRMAN: Would you repeat the question, or do you want it to come back from the reporter?

Mr. BOISVERT: I said as to the certainty of the execution is the guillotine not the most effective instrument?

Mr. FAIREY: So is shooting.

The PRESIDING CHAIRMAN: We have the answer. Mr. Thatcher.

Mr. THATCHER: First of all, I would like to ask the doctors if either one has witnessed a hanging?

Hon. Mr. GARSON: They said they had not.

Mr. THATCHER: Well, we can take it from the evidence that both gentlemen have given today that they think hanging is a very painful and a very inhuman way of execution, is that a fair conclusion?

Dr. FERGUSON: Mr. Chairman, my opinion about hanging is that I am against it, I think it is uncertain and may be painful and terrifying.

Mr. THATCHER: Did I understand you also to say, of all the methods of execution you can think of, that the electric chair would probably be the least painful and the most certain?

The PRESIDING CHAIRMAN: And the least terrifying, would you add that?

Mr. THATCHER: No, I would say the least painful or the most humane.

Dr. FERGUSON: May I correct what I said before about hanging being not certain? It is not certain to produce rapid loss of sensation but it is as certain as any other to kill eventually. As for alternative methods, after thinking about them, I believe that electrocution is the most humane.

Mr. THATCHER: To get back to hanging for a moment, is there any way that the hangman can so fix the rope that he could get the first four or five vetebrae that you have mentioned to bring instant death, or when there is a drop is it just by chance which one would snap?

Dr. FERGUSON: Well, this is an art in which I am not skilled, but judging from the autopsy reports which I read it would appear that the present hangman in England has developed his art to a very high degree, better than his predecessors, so far as producing fractures in the right place.

The PRESIDING CHAIRMAN: How long has he been in practice, do you know?

Dr. FERGUSON: I cannot remember, but I do know he did a great many of the Nuremberg executions, so he has had a lot of practice. My feeling is that we cannot rely on getting that degree of natural talent or skill or hereditary advantages and even if I had his skilful attentions for my execution I would rather have it some other way.

Mr. THATCHER: Just one other question. You mentioned in point 10 of your summary that, if hanging is retained, you think a drug or a gas should be given. Do you mean that drug or gas should be given more or less as a drug before he is hanged or should he be given that as an alternative method of choosing death?

Dr. FERGUSON: My thought was it should be an alternative method of death.

Mr. THATCHER: That is all, Mr. Chairman.

Dr. "X": There was a question you addressed generally to us. I think experience of neurosurgeons is firm that on one point, which is that once the lower brain stem is damaged, the patient is immediately unconscious and dead. My observation regarding the present situation on hanging in Canada, is that it is highly unpredictable. I have no knowledge of how people are hanged, I am not sure that their caritod arteries are regularly compressed and unconsciousness is produced in a matter of a few seconds.

The PRESIDING CHAIRMAN: I do not think it is an unfair question, and I would like to ask this: what are your views—and this has nothing to do with your professional capacity—with respect to capital punishment; do you believe that we should have capital punishment or not?

Dr. FERGUSON: I am not against capital punishment. It is a matter of expediency, as far as I am concerned. If juries are at the point where they will not convict because they are afraid that the death sentence will be imposed,

perhaps the death penalty should be abolished as a matter of expediency. I think in principle we still have the right to deprive an individual of his or her life as the case may be, and certainly I would just as soon see criminals deprived of their lives as young men sent forth to battle. We require in some circumstances that people give up their lives, and I do not see why criminals should be exempt from this. I do not like the idea of capital punishment as such, it seems that this desire for retribution is an old and deep-seated one, which everybody wishes to impose at some time or another, and then feels ashamed of later. Therefore, we are in a state of inconsistency with regard to our law. I think that many thoughtful people I have talked with feel that exemption from capital punishment because of insanity is a very illogical position to which we have brought ourselves; namely, that you should not suffer a punishment unless you are "responsible". The tendency of psychiatry seems to make people less and less responsible, and to make it easier to find excuses for them not being responsible for what they did. In my opinion, and that of a lot of people with whom I have talked, it would seem more sensible to deprive the less responsible people of their lives than those who have a higher degree, because more responsible people might not do it again. In Toronto recently we have reason to think that an irresponsible maniac has killed two women. Those are non-professional opinions.

The PRESIDING CHAIRMAN: Would you care to comment, Dr. "X"?

Dr. "X": No, I do not care to.

Mr. WINCH: I have only one question. In the event of a man being hanged, he is dropped and then, for approximately a minute afterwards, there are gurglings and sighings. From a medical point of view, is that the natural reflex from that kind of death, or does that mean he is not dead yet?

Dr. "X": Well, this is a question of words again, is it not? What do you mean by "gurglings and sighings"?

Mr. WINCH: I am one member of this committee who has seen a man hanged, and immediately after he was dropped there was gasping, there were gurgles just like you were gargling water, there was gurgling and deep sighs that lasted about a minute. Was the man dead? Is that a natural reflex if your neck is broken and the arteries clotted, or does that mean the man is still alive and is trying to live on?

Hon. Mr. GARSON: I wonder if we do not get ourselves into a lot of unnecessary confusion by these terms we use. Of course the man is still alive if he is still gurgling, but are we not interested in whether he is unconscious or not. It is accomplishing his death and it is the unconsciousness that we are concerned about?

Mr. WINCH: That is one part of the question; could he be conscious and trying to do that?

Hon. Mr. GARSON: He is obviously alive; there is no use asking the doctor if he is alive when he is still gurgling, but is he unconscious?

Mr. WINCH: I will put it that way if you like.

Dr. "X": I think that is the right way to put it, it is almost impossible for me to answer your question. I would say that if he was having convulsions with movement of his arms and legs because his cord was damaged, he might have some convulsive movements in his throat and face because the nerves to the throat and face go up higher in the brain, it is quite possible he could be unconscious and have convulsive movements in his throat and face.

The PRESIDING CHAIRMAN: It is also possible that he could be conscious.

Hon. Mr. GARSON: Is that a question or an assertion?

The PRESIDING CHAIRMAN: I am merely following it up. You say it is also possible he could be conscious and convulsing and it is also possible he may be unconscious.

Dr. "X": Yes, I cannot say, it is impossible. Could I ask Mr. Winch a question?

The PRESIDING CHAIRMAN: Yes.

Dr. "X": Did this victim move his legs following the drop?

Mr. WINCH: Witnesses are not allowed down there; they have to stay up; you cannot see him after he drops.

Dr. "X": And the hangman goes in and, when he thinks the individual is dead, he calls the doctor?

Mr. WINCH: At the hanging I saw, the witnesses were not allowed down below, so what happened down below I have not the faintest idea.

Dr. "X": But the hangman went down below?

Mr. WINCH: He was the last one out of the room where the trap-door was and where he went I do not know, because all the witnesses have to leave first.

Dr. "X": It is practically impossible to give an intelligent guess as to what happens to these people without autopsy material and maybe if there is a closer record of what happens in the first five minutes following the drop—

Mr. BLAIR: I do not like to interrupt, but Mr. Garson asked a question earlier which may be of importance. Even if a skilful autopsy were performed, would it be possible to determine whether a man would be conscious for any length of time after his neck was broken?

Dr. "X": I cannot answer that question accurately because I am not a pathologist, Mr. Blair. I am sure there would be a good deal of indirect evidence in terms of signs of injury to the carotid arteries and to the windpipe and to the brain above the cord and so on, there would be a good deal of indirect evidence.

Mrs. SHIPLEY: To show what?

Dr. "X": To show what had happened to the man in the contractions of his carotid arteries and windpipe and brain and the cord.

Mrs. SHIPLEY: And you can assume that he was unconscious from that?

Dr. "X": Well, there would be indirect evidence and it is the kind of problem that would take some thought and time by an expert pathologist.

Dr. FERGUSON: May I ask Dr. "X" if, in some cases, you could say pretty definitely that consciousness was lost in a hurry and in some cases, probably not, and there would be a lot of cases, on which you could not give a conclusion?

Dr. "X": Reading over these autopsy reports one could no doubt conclude that these patients lost consciousness when the cord was pulled from the medulla and the medulla pulled from the pons, the pons and medulla being part of the brain.

The PRESIDING CHAIRMAN: Mr. Winch, any more questions?

Mr. WINCH: No questions.

Hon. Mrs. HODGES: I would like to ask Dr. "X"—I have not the report of the royal commission today, but I understand that the royal commission after an exhaustive study of execution methods in other countries considered the electric chair and the gas chamber had no advantages over hanging and that hanging was the most effective—in your experience when you were speaking of executions in English prisons by Pierrepoint, are you of the opinion that the British commission's decision that hanging was the most effective had something to do with the fact that the hangman himself was more efficient?

Dr. "X": Yes, I believe that to be true. Furthermore, his efficiency was increased following the preliminary autopsy reports by Sir Bernard Spilsbury. If you will just let me quote from this—they were talking about dropping and somewhere in here the note is made that following these autopsies Sir Bernard Spilsbury made some suggestions about the technique of hanging.

Mr. BLAIR: Paragraph 4 (*in Appendix B*).

Dr. "X":

> It will be observed that in the early years there was some variation in the anatomical site of the fracture dislocation. I remember being told by Sir Bernard Spilsbury that he had made some suggestion as to the adding (or subtracting) three inches (or some such small distance) to (or from) the calculated figure for the length of the drop.

It is my impression from reading the vicissitudes of executions that are on the record; and the record put forward here is that there may be some distinct difference between the efficiency of hanging as carried out in Great Britain, and particularly from the point of view of this, than in Canada. I have no first-hand experience, I have just been reading the record.

Hon. Mrs. HODGES: Dr. Ferguson, do you think if we could see to it that our hangman was efficient and provided autopsies were conducted on people who had been hanged, do you think that we could make it a more humane method?

Dr. FERGUSON: I think that it would be more humane if we had a well-trained hangman who was sure of doing as good a job as Mr. Pierrepoint, but I would still not feel happy about hanging because, referring to the evidence of the royal commission, they said in their evidence that if it was a matter of establishing now a method of execution for the first time they would not necessarily choose hanging, but having regard to the importance of tradition in England they felt it was the best and most practical at the moment.

The PRESIDING CHAIRMAN: The most effective. In other words, it is final; there is no question about that but it is not probably the most humane.

Hon. Mrs. HODGES: I was asking the doctor's opinion on that but apparently they do not have any of the disastrous things that we have been told have happened in Canada.

Dr. FERGUSON: Not in recent years, no, but I feel that even the record of recent years does not satisfy me that it is the most humane method.

Hon. Mr. GARSON: The British record?

Dr. FERGUSON: Even the British record.

Dr. "X": May I make one point? I think Professor Ferguson has not clearly brought out in the treatment of certain mentally-ill patients—this is not my practice but I happen to know about it—electro-convulsive is used to relieve pain and suffering and the individual who has an electric shock to produce a convulsion has no recollection of the shock being applied. You said that, but I thought I should emphasize it. That is the situation that is repeated thousands of times, many patients have many electro-convulsive therapeutic shocks and many of them are very fearful of it, they dislike it intensely, but actually they have no recollection of the shock being applied.

Hon. Mrs. HODGES: Dr. "X", could I ask a question following that? Would that apply to people who were sane and had an electric shock?

Dr. "X": Oh, yes, it is a physiological observation.

Hon. Mrs. HODGES: I was wondering whether a normal person who had an electric shock—

Hon. Mr. GARSON: Would it be possible for it to be the type of pain which could be experienced but not remembered?

Dr. "X": My own feeling is that it is like an injury to the brain, if any of you have been knocked out with a minor concussion you never remember the actual blow hitting you, you have what is called a momentary amnesia for seconds or minutes, sometimes much longer, before the injury.

Hon. Mr. GARSON: And it would be as fair an inference as we could draw with our present knowledge that, that which a man cannot remember after living, probably he does not experience if death supervened.

Dr. FERGUSON: That is a very difficult, almost an impossible question to answer. Is there such a thing as pain which leaves no record in the brain?

Hon. Mr. GARSON: No memory, yes.

Dr. "X": Well, there is no doubt that in electro-convulsion therapy there is no recollection of the instant of the shock and no pain.

Dr. FERGUSON: I think that is the most certain kind of evidence we can get, it did not hurt.

Dr. "X": Not once but many times, and those of you who are barristers and have tried to find out from your clients just what happened at the moment of impact or of an injury will know that a patient who has been knocked out or has sustained a blow on the jaw or the head actually has no recollection of it. They remember seeing the car coming, but that is the last thing they do remember and it can be minutes, days or weeks later.

Hon. Mrs. HODGES: I have finished, thank you.

Hon. Mrs. FERGUSSON: There is a question I would like to ask. Could you tell us, Dr. "X", when Britain started having post-mortems after hangings?

Dr. "X": I only know what is in this report, it is 1931, and over here it is 1927.

Hon. Mrs. FERGUSSON: Thank you, that is all I have to ask.

Mr. MITCHELL (*London*): No questions.

Mrs. SHIPLEY: We had evidence from one witness that he was opposed to electrocution as a method because it left, for days and days, a horrible smell of burning flesh. We also had evidence from the warden of the prison in Illinois to the effect that the only reason there was that odor was because too great voltage was used. Would you comment on that contradictory evidence? Do you feel you could electrocute a person without that smell of burning flesh?

Dr. FERGUSON: Yes, I think from what we know now that burning comes from too much voltage applied.

Mrs. SHIPLEY: In point 10 of your summary you state that it might be advisable, if hanging is to be continued, to give the person the option of having an injection or anesthesia. We have reason to assume that no doctor would give such an injection or that kind of anesthesia. Do you think there is any manner that this could be done by trained people under the supervision of a medical man?

Dr. FERGUSON: I feel that any person who became trained in this procedure would do it on his own responsibility and not under the supervision of a medical man. The training is not a difficult matter, there are many veterinary clinics at which a person could obtain this training in Canada, but I am sure the medical profession as such would be opposed to having a supervisory function in the performance of that kind of execution even if it was very humane.

Dr. "X": I do not believe that any doctor who is trained and conditioned and whose primary object in life is to relieve pain and suffering and save life should be in any way associated with executions.

The PRESIDING CHAIRMAN: You think if he goes to a penitentiary he should be a horse doctor, then?

Mrs. SHIPLEY: Well, at the present time I think the law says that a medical man must be in attendance when hangings take place and so far as I know we have had no difficulty in getting prison doctors.

Dr. "X": That is different. I mean to take part in the execution.

Mrs. SHIPLEY: In part?

Dr. "X": Yes, in part.

Mrs. SHIPLEY: And you feel your being there when the injection is given would be taking part?

Dr. "X": Well, injections are regarded as a medical treatment by and large. It should not be the responsibility of the doctor either to supervise or instruct or give any injection, anesthesia or anything else. I speak as an individual, I am not here representing any medical association. It is my burning personal conviction, if an executioner has to kill people by injection or any other form of medical therapy, that should be in no way associated with the profession.

Mrs. SHIPLEY: I was just wondering about public reaction. If we had a person trained—it would not be difficult to train a person to give the injection or too much anesthesia. What would you think the reaction of medical men might be to pick a man who was not trained as a medical man giving such an injection?

Dr. "X": I cannot comment on that, you would have to enquire from a representative of the medical association.

Mrs. SHIPLEY: That is all, sir.

Mr. MONTGOMERY: Everything that I had in mind has been pretty well covered except the skill of the hangman and I gather from Professor Ferguson's evidence that if there was a highly skilled hangman and the knot could be adjusted consistently, possibly it would be as humane as any other way of doing it.

Dr. FERGUSON: I did not intend to give that impression.

Mr. MONTGOMERY: Maybe you did not, perhaps I got the wrong impression.

Dr. FERGUSON: I did not mean to imply that it was my opinion that hanging even with the most skilful hangman was as humane as electrocution. It is my opinion that it is not, that electrocution is more humane than the most skilful hanging. I think what I did say was that with a skilful hangman, the probability of a humane execution was much higher and I would like to hope that it was humane 100 per cent of the time, but I really do not believe it. It is just a hope.

Mr. MONTGOMERY: I think we can gather from that that in your considered opinion electrocution is the most humane and most instantaneous way of causing unconsciousness?

Dr. FERGUSON: That is my opinion, sir.

Mr. MONTGOMERY: Would you care to make any comment or say something concerning the use of gases?

Dr. FERGUSON: Yes, I can make some comment on that. I have no personal experience, I have only read the evidence which you have seen or read, and apparently in the process as practiced, cyanide gas is used. A gas type chamber with pumps is required. The process must be fairly rapid but it is

a matter of taking a few breaths of this gas which, to me, is unpleasant. I have smelled the stuff, I have had it around and it has a pungent odor. Unconsciousness is not instantaneous as it is with electric shock on the brain. I do not think it has any advantages.

Mr. MONTGOMERY: Are there any disadvantages in connection with officials or witnesses?

Dr. FERGUSON: In the gas chamber?

Mr. MONTGOMERY: Yes.

Dr. FERGUSON: I think that it would be just as gruesome as any of the others because I am sure there would be the usual convulsions and, as I say, this would mean to me the patient was unconscious and I would feel happy about it; but to a person who is not medically trained I think it would be very harrowing. You have to see many of them and be convinced inwardly that they mean nothing to the victim, before you can regard them calmly.

Mr. MITCHELL (*London*): What is the effect that gas has which causes death?

Dr. FERGUSON: This particular gas is absorbed into the blood which goes through the lung and it is carried from the lung to the brain and poisons the brain cells and stops the breathing quickly. It is carried to the heart and will stop the heart very quickly but I am not just sure which stops first.

Mr. MITCHELL (*London*): Is that the gas which attacks most quickly?

Dr. FERGUSON: It has that reputation.

Mr. MONTGOMERY: Professor Ferguson, have you had any experience with people who have been overcome by carbon monoxide from car exhausts and so on?

Dr. FERGUSON: Again I have not had any first-hand experience. I do know that the gas is odourless and does not cause any stimulation. It would not cause a very rapid death or instantaneous loss of consciousness but a rather pleasant one as with an anaesthetic because we know people come out of it and report no discomfort at all.

Hon. Mr. GARSON: A rather favorite form of suicide.

Dr. FERGUSON: It is very much as if you breathed commercial nitrogen out of a cylinder, in fact I wonder why they do not use that rather than poisonous cyanide.

Mrs. SHIPLEY: That would do away with the danger to others?

Dr. FERGUSON: Yes, and it would do away with the pungent odor.

Hon. Mr. ASELTINE: Mr. Chairman, the questions I had in mind were asked by Mr. Blair, but I would like to ask Dr. Ferguson this question: Am I correct in coming to the conclusion that there is no direct, concrete evidence that hanging is painful? In the first paragraph of your summary you say:

> "In my opinion execution by hanging should be abolished and replaced by a method which is known to be painless."

I take it from that that you do not know whether hanging is painful or not.

Dr. FERGUSON: That is exactly it, I do not know because a properly hanged person has never come back.

Hon. Mr. ASELTINE: Well, would you care to comment on this point: would you say that a convicted person should have a choice as to the manner of his execution?

Dr. FERGUSON: I feel it would be a humane thing. I know there may be practical disadvantages, you would have to provide a person trained to administer a variety of deaths. I do not know that it would be practicable, but I do feel it would be humane.

Hon. Mr. ASELTINE: I think if I were in that position I would like to have some choice in the matter.

Hon. Mr. GARSON: Dr. Ferguson, I wonder if, rather than answering questions, you would audit my thinking a little bit and tell me if I have got a wrong impression from your evidence. You said that there were many portals to death through which many had passed and had returned. Now, I got the impression that those portals through which they went were not the portals to death but the portals to unconsciousness because no one actually returns from death. We are really dealing not so much with portals as with corridors, and we have walked the portal into the corridor of unconsciousness, and the intention is that at the end of that corridor is death. Our problem in this committee is to find that method of taking the accused person through the first portal, through the whole corridor and on to death but having him unconscious as soon as possible. I gathered this—and it is an inference and perhaps you would tell me whether it is a right one—that a lot of the agony through which the accused goes is not physical at all but it is his worry about how he is going to die and what the effect will be when he drops and whether he is going to hang there in pain and so on. That was the reason for your last answer that he should have his choice because the choice would be that which would cause him the least mental agony. Is that a legitimate inference?

Dr. FERGUSON: I think I agree with everything you have said, Mr. Garson.

Hon. Mr. GARSON: And the advantage of the electric chair, the electric shock as you describe it—and the disadvantages that we have heard where it is practised with less skill than perhaps it might be—is that this shock can be quite instantaneous and you would know he was unconscious at once?

Dr. FERGUSON: I agree.

Hon. Mr. GARSON: You say you could know?

Dr. FERGUSON: I believe that we know that with the greatest possible certainty.

Hon. Mr. GARSON: And the equation here then, in the British recommendation for the continuance of hanging, is under the conditions there of considerable certainty as to painlessness?

Dr. FERGUSON: Much better than we have.

Hon. Mr. GARSON: I should say less uncertainly of and on the one hand complete certainty of painlessness by the method you have put forward: Are those fair inferences to draw?

Dr. FERGUSON: Very fair.

Mr. WINCH: Why do you have such a degree of certainty on the effect of electric current? The reason I ask this: I have seen a man killed by 110 and I have also seen a man, one of my own partners at work, get hit with a 2,300 and he lived, as a matter of fact he was back at work in half an hour. You get killed by 110 and you can live after 2,300 or it can be the other way around; so why are you so certain, on account of the way it is handled and the length of time it is given?

Dr. FERGUSON: It is a matter of where the current is applied; whether the current is put through the head through the body or through an arm. As little as one-tenth of an ampere through the brain will stop consciousness instantaneously but if it is through the arm it does not do anything.

Hon. Mr. GARSON: That has been the experience in the application of shock treatment to insane patients?

Dr. FERGUSON: Yes, and to answer another question, many are not very insane.

Dr. "X": People for the most part who are depressed and suffering.

Miss BENNETT: Following what the minister has said, is it right for us to assume from the evidence that we have here from the doctors that in the performance of the execution itself, from the standpoint of a person who performs it—a hanging is more technical—and, therefore, there is less human error on the part of the person who performs the execution in an electrocution than hanging? I simply mean is there less chance of there being a human error on the part of the person who does the job in an electrocution than in the hanging?

Dr. FERGUSON: I am trying to think about that question because in one case you have a technical knowledge of electricity required and the other a certain amount of manual skill and experience. I believe that with well-designed equipment the human skill required for an electrocution would be a great deal less than hanging.

Miss BENNETT: And less chance of error?

Dr. FERGUSON: Less chance of error.

Miss BENNETT: That is what I wanted to know.

Hon. Mr. GARSON: Would it be oversimplifying it to say it would be nothing more than putting the electrodes on each side of the head and putting through a shock of a certain strength?

Hon. Mrs. HODGES: Pressing a button?

The Presiding CHAIRMAN: You do not put it on the head.

Dr. FERGUSON: Yes, as I understand the way it has been done in some of the states, it is put on the shaved head and another pad on the back of the calf which is a decent way. In my own opinion, which is from experience with electric shock and working in the laboratory, there might be one on the forehead and one on the calf. That should be sufficient without shaving the head.

Mr. BLAIR: To follow up this line of questioning—both our witnesses have read the English report—would they not agree that when the English royal commission was considering the question of humanity it had regard not only to the actual effect of the hanging in producing immediate unconsciousness but the preliminaries, the preparation of the victim for the hanging or the execution? Would they not agree that the commission in part formed their opinion on the basis of a finding that there were fewer preliminaries and they were conducted more quickly in hanging than any other method of execution?

Dr. FERGUSON: I think so, yes. The British Medical Association's statement was, I thought, an admirable one both by what it said and by what it did not say, which implied to me some mental reservations.

Mr. BLAIR: Page 318 of the testimony is it not?

Dr. FERGUSON: They were not sure that anything else was enough better to make it worth while in view of the British experience and tradition. I think there was some discussion to the effect that maybe execution should not be entirely painless.

Mr. BLAIR: That leads me to my next question. If one of the considerations is the length of time for preparation, is it possible to make the preparations for an electrocution less arduous than the ones we have had described to date?

Dr. FERGUSON: I believe so, Mr. Chairman.

Mr. BLAIR: Would it be necessary at all times to affix an electrode to the leg or could the electrocution be accomplished by fitting a soft cap on the head?

Dr. FERGUSON: I do not think the head electrode would be sufficient.

Mr. BLAIR: So that to efficiently conduct an electrocution you would always have to put the electrode on the head and some other part of the body, preferably the leg?

Dr. FERGUSON: The reason is, you have to lead the current through the heart if you are going to stop the heart. If it is a matter of producing unconsciousness, electrodes on the head are sufficient, but since it is desirable to accomplish both purposes at the same time, the current should be led through the head and through the heart and out through the leg.

Mr. BLAIR: And that would necessitate the elaborate strapping of a person into a chair where these electrodes could be in place?

Dr. FERGUSON: I think some kind of restraint is necessary, it would not have to be a chair, it could be a table, it could even be a bed.

Mr. BLAIR: I have one further question about gassing. Did I understand Dr. Ferguson to say the cyanide was perhaps the quickest acting gas of which the medical profession has knowledge?

Dr. FERGUSON: It is reputed to be, I have reservations on that point, I do not know of any faster one, but I am not sure that it induces loss of consciousness in only a few seconds.

Mr. BLAIR: I understood you to say it would take more than one gulp or one breath?

Dr. FERGUSON: I think so.

Mr. BLAIR: I noticed in your evidence you treated gassing separately from anaesthesia and the application of nitrous oxide you regard as being a different process than the application of gas.

Dr. FERGUSON: Yes, it is different because it would not require elaborate equipment. It would not be dangerous to the inmates of the building, so it is a different procedure altogether.

Mr. BLAIR: How would you apply that, by a mask to the face?

Dr. FERGUSON: Yes, or a helmet over the head or a simple service gas mask.

Hon. Mr. GARSON: That runs about what, ten seconds? I was asking how long it takes the nitrous oxide to have effect?

Dr. FERGUSON: Not very long, it is variously reported at fifteen seconds to one minute, but I think those people who are thinking of one minute are thinking of people getting it with some air or oxygen which slows its action. I think it is a matter of a few breaths.

The Presiding CHAIRMAN: If you could hold your breath for three or four minutes—

Dr. FERGUSON: That is the big trouble, it requires the acquiescence of the person. It is very pleasant, medical students and nurses have been known to play with it and put themselves out with it for fun.

The Presiding CHAIRMAN: Any further questions? Senator Tremblay?

Hon. Mr. TREMBLAY: No.

The Presiding CHAIRMAN: Are there any other questions by members of the committee?

Mr. BLAIR: Mr. Chairman, I wonder if the witnesses, in view of the questions, have any final comment they would like to add?

Dr. FERGUSON: May I read from the British Medical Association report, the sentence which struck me:

> So far as it can be judged from the opinion of these people the association considers that hanging is probably as speedy and certain as any other method that can be adopted.

I think that is a masterpiece of careful statement.

Mr. BLAIR: For the record, could you give the page and paragraph?

Dr. FERGUSON: Page 318, minutes of evidence No. 14, Royal Commission on Capital Punishment.

Hon. Mr. GARSON: It could be.

Dr. FERGUSON: All things considered.

The Presiding CHAIRMAN: If there are no furthers questions...

Hon. Mr. GARSON: May I ask this? I think mention was made of the guillotine, from the standpoint of certainty, humanity and everything except the aesthetic viewpoint; that it would compare very favourably indeed with any of those others? There is no question about absolutely instantaneous unconsciousness?

Dr. FERGUSON: I would raise a little question there, if the guillotine happened to hit the low cervical vertebrae, e.g. 5 or 6, I think it is possible there might be five seconds of consciousness in that severed head.

Dr. "X": It is the same principle of cerebral anemia, it would be absolute anemia if it is a hypothetical question.

Hon. Mrs. HODGES: It is such a gruesome way, though.

Dr. FERGUSON: It is very effective, but I do not think it is as quick and as humane as electrocution.

Mr. BLAIR: I have one other question I would like to ask Dr. Ferguson. In order to produce unconsciousness or death by injection, the injection would have to be put in a vein or could it be simply put in the flesh?

Dr. FERGUSON: I do not know of any drug which could be injected into the muscles to produce rapid loss of consciousness. Intravenous injection can produce loss of consciousness in a few seconds but the drug must be put into the vein and that means some cooperation.

Mr. BLAIR: As I understand it, there are some people to whom you could not give an injection whether they cooperated or not; their veins are not able to take it?

Dr. FERGUSON: That is true, there may be one in a hundred or one in a thousand with veins which are very difficult to enter with a needle.

Dr. "X": I would like to make one more point, Mr. Chairman. If capital punishment is to be continued, whatever method of execution is continued or adopted, part of that procedure should be a careful post-mortem examination by a highly qualified pathologist. Then, should this situation be reviewed again in 5, 10 or 20 years, there will be sufficient information available for the method that is to be adopted to be assessed accurately and honestly. Today it is most difficult to assess what has happened in Canada in executions.

Hon. Mr. GARSON: Would you not say, Doctor, that in England where they had this, there is a long list of fractures?

Dr. "X": I would be sure that any post-mortem report done by men like Spilsbury and so on would be detailed. He refers to hemorrhages in the lungs and other things. This is just a summary here.

Hon. Mr. GARSON: But in all cases certainly there is not a single exception in both those lists of fracture or dislocation of the cervical or the spine.

Dr "X": You can have a fracture dislocation of the cervical spine without spinal cord separation and then you would not get paralysis and presumably the force would not be applied to the brain stem and you would not get unconsciousness.

Hon. Mr. GARSON: Would you say, in these reports here, it was not shown that the cord was severed; that there was perhaps unconsciousness? There is 1 to 3.

Dr. "X": That is early and I suspect that they did not comment on the cord; that is in the 1930's. There are about 6 cases and in those cases it would be impossible to say whether there was spinal cord injury.

Hon. Mr. GARSON: This is on page 626 of the United Kingdom report.

Dr. "X": That would be either a carotid artery compression or anemia of the brain which would require seconds.

Hon. Mr. GARSON: But there might be some pain?

Dr "X": For a few seconds and, if he had asphyxia, there would definitely be pain.

Mr. BLAIR: I wonder, in view of the frequent references which have been made to this table of post-mortem reports from the evidence of the United Kingdom Royal Commission, if we could authorize publication of these tables as an appendix to the testimony today.

The CHAIRMAN: Would that be agreeable to the committee?

Agreed. (*See Appendix B*)

Mr. MONTGOMERY: Mr. Chairman, might I ask whether in England do they carry out executions at a central prison?

Mr. BLAIR: No, I think they carry them out at the prison closest to the place where the person is convicted. But they are central prisons in the sense that they are all under the administration of the United Kingdom government and are not local county prisons.

Mr. MONTGOMERY: Like we have here in Canada.

Hon. Mr. GARSON: There is one paragraph here in relation to these questions I have asked that I think has some bearing. It is on page 626, paragraph 3:

> One thing stands out. In no case has there ever been any suggestion of a suffocatory death, or any internal signs of asphyxia, though the one hour's suspension does produce visible congestion above the ligature; this is not a sign of asphyxia.

Dr. "X": That is right.

Hon. Mr. GARSON: That would exclude, in all these cases, any signs of the pain of asphyxiation?

Dr. "X": That is right.

Mr. BLAIR: I think perhaps to put these tables in perspective it might be just as well to include the memorandum of the British coroner, Mr. W. B. Purchase, to which these tables are appended. It is a very short document and has been referred to. It occurs on page 626 of the minutes of evidence of the United Kingdom Royal Commission.

The Presiding CHAIRMAN: Is that agreeable to the committee.

Agreed. (*See Appendix B*)

Mr. BLAIR: Did Dr. "X" have another comment to add?

Dr. "X": Presumably these patients died either of carotid compression or cerebral anemia and they were not unconscious for seconds probably, or of injury to their spinal cord.

Mr. BLAIR: Then immediate shock?

Dr. "X": Yes. One of those two things.

Hon. Mr. GARSON: I presume it would be those factors upon which the commission would base its report recommending that hanging be retained as a means of execution?

Dr. "X": They would be very important factors.

Hon. Mr. GARSON: That could only be achieved if the same degree of skill was available here as is it demonstrated is available in Britain?

Dr. "X": Which it is reasonably assumed is not available in Canada from what has been reported in the evidence.

The Presiding CHAIRMAN: Are there any further questions? If not, I wish to extend on behalf of this committee to Dr. Ferguson and Dr. "X" our very sincere thanks for their very informative evidence and comments which they have made here today. We thank them very much for coming here and of being of assistance to us and we know that their evidence will be most valuable to us when we write our report. Again, on behalf of the committee, may I express to you our sincere thanks and appreciation.

(The committee continued *in camera*).

APPENDIX "A"

SUMMARY OF TESTIMONY BY J. K. W. FERGUSON M.D., PROFESSOR AND HEAD OF THE DEPARTMENT OF PHARMACOLOGY, UNIVERSITY OF TORONTO,

TO THE

COMMITTEE OF THE SENATE AND HOUSE OF COMMONS ON CAPITAL AND CORPORAL PUNISHMENT AND LOTTERIES, MAY 10, 1955.

1. In my opinion execution by hanging should be abolished and replaced by a method which is known to be painless.

2. No assurance can be given that judicial hanging by breaking the neck always causes instantaneaus loss of consciousness.

3. There is good reason to believe that loss of consciousness may be as slow as with hanging by strangulation.

4. Strangulation is, however, less gruesome than is commonly supposed. Loss of consciousness is probably complete in 10 to 20 seconds.

5. Deeply ingrained fear of falling and of a painful shock must add to the terror of hanging.

6. The whole process of judicial hanging is deeply shocking to modern witnesses and is, we are told, deleterious to morale in the penal institutions where it takes place.

7. Electrocution is known to cause instantaneous loss of consciousness.

8. There is no need for the enormous electric currents which have been used in the past and which have caused burns.

9. The use of cyanide gas has no advantages, in my opinion, over electrocution and has some disadvantages.

10. The intravenous injection of certain drugs or the inhalation of certain anaesthetic gases are known to be pleasant ways of inducing loss of consciousness but require acquiescence by the subject. It would be humane to offer such methods as alternatives to hanging. I do not regard them as more humane than electrocution.

APPENDIX "B"

EXTRACT FROM THE MINUTES OF EVIDENCE OF THE U. K. ROYAL COMMISSION ON CAPITAL PUNISHMENT TAKEN ON NOVEMBER 3, 1950.

Memorandum Submitted by Mr. W. B. Purchase, C.B.E., M.C., Coroner for the Northern District of London

1. A post-mortem examination has been made after every execution by hanging at Pentonville Prison, with the exception of certain war-time cases, since I was appointed Coroner 20 years ago. At that time it was not the practice to make a post-mortem examination, but the prison medical officer was permitted to make an incision into the neck and ascertain, if he could, with his finger tips that fracture dislocation had taken place. The then medical officer, Dr. Sass, was meticulous in this and I had no reason to doubt his evidence, but I was determined to take all possible steps to see that the method of execution then employed was as satisfactory as it was supposed to be. I therefore decided to have a post-mortem made in every case. They were at first made by Dr. Sass later by Sir Bernard Spilsbury and after his death by others—Dr. Davidson (Director, Metropolitan Police Laboratory), Dr. Glynn (Pathologist, University College Hospital), Dr. Thackray (Middlesex Hospital) and Dr. Donald Teare and Dr. Francis Camps, who are independent pathologists.

2. I attach a schedule (Appendix A) showing the effective cause of death of 38 prisoners who were executed for murder in Pentonville Prison between August, 1931, and March, 1950. The information extracted from the records of post-mortem examinations and given in this appendix contains all that is relevant and is based on a complete and unselected series.

3. One thing stands out. In no case has there ever been any suggestion of a suffocatory death or any internal signs of asphyxia, though the one hour's suspension does produce visible congestion above the ligature; this is not a sign of asphyxia.

4. It will be observed that in the early years there was some variation in the anatomical site of the fracture dislocation. I remember being told by Sir Bernard Spilsbury that he had made some suggestion as to the adding (or subtracting) three inches (or some such small distance) to (or from) the calculated figure for the length of the drop. I do not know whether we should look to this for the considerable uniformity from about 1944 onwards, but it is of interest that the post-mortems from 1944 up to date have been made

by all the other pathologists independently and the results tend to show that a fracture dislocation at the 2/3 or 3/4 cervical vertebrae is now made with division there of the spinal cord. This must cause instantaneous death, though physiologically the heart may not stop for a minute or two.

5. Sir Bernard Spilsbury, Dr. Camps and some others, such as Dr. C. K. Simpson, have done similar work at Wandsworth prison for my colleague, Mr. Hervey Wyatt (the Coroner for the Southern District of London). I understand from the last two that their findings there are in agreement with those at Pentonville.

6. I have had an opportunity of examining Sir Bernard Spilsbury's records relating to 20 cases at Wandsworth Prison. I attach a summary of his findings (Appendix B). In case "C" there are some signs of asphyxia, namely petechiae in the lungs, but the surrounding circumstances exclude asphyxia as the cause of death, since the cord was damaged though not torn through. There is a note by Sir Bernard Spilsbury that the prisoner was thought to have breathed for four minutes, but unconsciousness must have occurred at once from damage to the central nervous system; breathing in an automatic and convulsive way could occur if the noose did not at once cause a final and tight constriction. In none of the other cases is there any suggestion that even partial asphyxia took place during the process of death. In a few cases petechiae were seen upon the heart, but such signs of asphyxia can occur if respiration or the beating of the heart take place after death has been caused, e.g. by fatal damage to the central nervous system. There is therefore nothing in the record of such cases which is inconsistent with the findings of Sir Bernard Spilsbury and his colleagues at Pentonville Prison.

7. On more than one occasion I have attended executions myself in prison and in the field (1914-1918). I have no doubt of the efficacy and immediate and painless finality of the present method of judicial execution: it seems to me to be more humane and less likely to cause pain than execution by a firing squad, of which method I have had experience.

November 1950.

TABLE A

Executions at Pentonville Prison,. 1931-1950

Case	Year	Effective cause of death
1	1931	Fracture dislocation cervical spine.
2	1931	Fracture dislocation cervical spine.
3	1932	Fracture dislocation $\frac{3}{4}$ cervical vertebræ.
4	1932	Wide separation $\frac{5}{6}$ cervical vertebræ; cord torn.
5	1933	Fracture dislocation with wide separation.
6	1933	Fracture dislocation $\frac{1}{2}$ cervical; cord crushed; medulla damaged also.
7	1933	Fracture dislocation $\frac{5}{6}$ cervical; cord pulped.
8	1934	Fractured dislocation $\frac{5}{6}$ cervical.
9	1934	Fractured dislocation $\frac{5}{6}$ cervical.
10	1935	Fractured dislocation $\frac{3}{4}$ cervical.
11	1935	Fractured dislocation $\frac{2}{3}$ cervical; cord severed.
12	1937	Fractured dislocation $\frac{1}{2}$ cervical; cord severed.
13	1937	Fractured dislocation $\frac{1}{2}$ cervical; cord crushed.
14	1937	Fractured dislocation $\frac{3}{4}$ cervical; cord severed.

Case	Year	Effective cause of death
15	1940	Fracture 1st cervical; wide separation.
16	1941	Fracture dislocation 4/5 cervical; cord compressed.
17	1941	Fracture dislocation 3/4 cervical; cord torn from medulla.
18	1942	Fracture dislocation 4/5 cervical; cord crushed.
19	1942	Fracture dislocation 4/5 cervical; cord crushed.
20	1943	Fracture dislocation 4/5 cervical; medulla torn from pons.
21	1943	Fracture dislocation 3/4 (and partial 6/7) cervical; cord torn from medulla.
22	1943	Fracture dislocation 6/7 cervical; cord ruptured.
23	1944	Separation 2/3 cervical; corn (sic) torn from pons.
24	1945	Fracture dislocation 3/4 cervical; cord torn across.
25	1945	Fracture dislocation 2/3 cervical; cord severed.
26	1945	Fracture dislocation 2/3 cervical; cord severed.
27	1946	Fracture dislocation 2/3 cervical; cord severed.
28	1946	Fracture dislocation 3/4 cervical; cord severed.
29	1946	Fracture dislocation 2/3 cervical; cord severed.
30	1947	Fracture dislocation 3/4 cervical; cord severed.
31	1947	Fracture dislocation 2/3 cervical; cord lacerated.
32	1947	Fracture dislocation 2/3 cervical; cord lacerated.
33	1948	Fracture dislocation 3/4 cervical; cord lacerated but old T.B. spine with deformity unaffected.
34	1949	Fracture dislocation 2/3 cervical; cord severed.
35	1949	Fracture dislocation 2/3 cervical; cord severed.
36	1949	Fracture dislocation 2/3 cervical; cord severed.
37	1950	Fracture dislocation 3/4 cervical; cord severed.
38	1950	Fracture dislocation 3/4 cervical; cord severed.

TABLE B

Executions at Wandsworth Prison, 1927-1943:

Post Mortem Examinations by
Sir Bernard Spilsbury

	Year	Effective cause of death
A	1927	Fracture dislocation 6/7 cervical; cord little torn.
B	1928	Fracture dislocation 6/7 cervical; cord undamaged.
C	1935	Fracture dislocation 5/6 cervical; cord pinched; some petechiæ in lungs.
D	1939	Fracture dislocation 4/5 and 5/6; cord crushed.
E	1939	Fracture dislocation 5/6; cord softened.
F	1939	Fracture dislocation 5/6; cord severed; 1 inch separation.

	Year	Effective cause of death
G	1939	Fracture dislocation 6/7; cord torn.
H	1940	Fracture dislocation $\frac{4}{5}$; cord softened.
I	1942	Fracture dislocation $\frac{2}{3}$; cord severed.
J	1942	Fracture dislocation $\frac{4}{5}$; 2 inch separation; cord softened.
K	1942	Fracture dislocation $\frac{3}{4}$; cord crushed.
L	1942	Fracture dislocation $\frac{3}{4}$; cord severed; 2-2$\frac{1}{2}$ inch separation; noose slipped on jaw.
M	1942	Fracture dislocation $\frac{3}{4}$; cord severed.
N	1942	Fracture dislocation $\frac{4}{5}$; 1-1$\frac{1}{2}$ inch separation; cord crushed.
O	1942	Fracture dislocation 6/7 and $\frac{1}{2}$ dorsal; cord crushed.
P	1943	Fracture dislocation $\frac{3}{4}$; cord torn from medulla.
Q	1943	Fracture dislocation 6/7; pons torn from medulla.
R	1943	Fracture dislocation $\frac{2}{3}$; cord torn.
S	1943	Fracture dislocation $\frac{3}{4}$; cord crushed.
T	1943	Fracture dislocation $\frac{4}{5}$; medulla torn.